

Claims

1. An electric energy storage device comprising a capacitor and a secondary battery combined in series.

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2. The electric energy storage device as claimed in claim 1, wherein an electric capacity of the secondary battery is about 4-100 times of an electric capacity of the capacitor.

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3. The electric energy storage device as claimed in claim 1, wherein the secondary battery is one of a lead acid battery, a nickel-cadmium (Ni-Cd) battery, a nickel-metal hydride battery and a lithium ion battery, and the capacitor is one of an electric double layer capacitor, a metal oxide pseudo capacitor and a hybrid capacitor.

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4. The electric energy storage device as claimed in claim 1, further comprising an over-voltage preventing device connected to both end portions of the capacitor.

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5. The electric energy storage device as claimed in claim 4, wherein the over-voltage preventing device is an over-voltage preventing circuit comprising a voltage comparator for comparing a predetermined voltage and an applied voltage, a switch for flowing electricity when the applied voltage exceeds the predetermined voltage and a breeder resistor for discharging the capacitor when the switch flows the electricity.

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6. The electric energy storage device as claimed in claim 4, wherein the

over-voltage preventing device is a Zener diode.

7. The electric energy storage device as claimed in claim 4, wherein the over-voltage preventing device is a shunt regulator.

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8. The electric energy storage device as claimed in claim 1, further comprising an over-discharge preventing device connected to both end portions of the secondary battery.

10 9. A method of charging and discharging of an electric energy storage device comprising a capacitor and a secondary battery connected to the capacitor in series, the capacitor being discharged to 0V or less.

15 10. The method of charging and discharging of an electric energy storage device as claimed in claim 9, wherein an electric capacity of the secondary battery is about 4-100 times of an electric capacity of the capacitor.

20 11. The method of charging and discharging of an electric energy storage device as claimed in claim 9, wherein the capacitor is an electric double layer capacitor and the secondary battery is one of a lead acid battery, a nickel-cadmium (Ni-Cd) battery, a nickel-metal hydride battery and a lithium ion battery.

25 12. The method of charging and discharging of an electric energy storage device as claimed in claim 9, further comprising an over-voltage preventing device connected to both end portions of the capacitor.

13. The method of charging and discharging of an electric energy storage device as claimed in claim 12, wherein the over-voltage preventing device is an over-voltage preventing circuit including a voltage comparator for comparing a predetermined voltage and an applied voltage, a switch for flowing electricity when the applied voltage exceeds the predetermined voltage and a breeder resistor for discharging the capacitor when the switch flows the electricity.

14. The method of charging and discharging of an electric energy storage device as claimed in claim 12, wherein the over-voltage preventing device is a Zener diode.

15. The method of charging and discharging of an electric energy storage device as claimed in claim 12, wherein the over-voltage preventing device is a shunt regulator.

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16. The method of charging and discharging of an electric energy storage device as claimed in claim 9, further comprising an over-discharge preventing device connected to both end portions of the secondary battery.